



## DEPARTMENT OF PUBLIC UTILITIES SAFETY POLICY MEMORANDUM

POLICY NUMBER: 1	DATE: April 17, 2002
TITLE: Confined Space Program	APPROVED BY: Martin McIntyre

### REFERENCE

Title 8, California Code of Regulations, Chapter 4, Subchapter 7, Group 16, Article 107, Section 5144, Respiratory Protection

Title 8, California Code of Regulations, Chapter 4, Subchapter 7, Group 16, Article 107, Section 5155, Airborne Contaminants

Title 8, California Code of Regulations, Chapter 4, Subchapter 7, Group 16, Article 108, Section 5157, Permit-Required Confined Spaces

American National Standards Institute/National Fire Protection Association (ANSI/NFPA) Standard 820, Fire Protection in Wastewater Treatment and Collection Facilities

City of Fresno, Injury and Illness Prevention Program, Confined Space Program

### PURPOSE

To supplement the instructions outlined in the City of Fresno Confined Space Program to meet the needs of the Department of Public Utilities.

### POLICY

It is the policy that the Department of Public Utilities that employees are to be protected from the hazards found in confined space operations, provided information and communications needed by employees, and be properly trained and equipped to conduct confined space operations.

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### DEFINITIONS

**Confined space** means that:

- Is large enough and so configured that an employee can bodily enter and perform assigned work; and
- Has limited or restricted means for entry or exit; and
- Is not designed for continuous employee occupancy.

**Hazardous atmosphere** means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue, injury, or acute illness from one or more of the following causes:

- Flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit.
- Airborne combustible dust at a concentration that meets or exceeds its LFL.
- Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent.
- Atmospheric concentration of any substance for which a dose is published in Group 14 for Radiation and Radioactivity or a permissible exposure limit is published in Section 5155 for Airborne contaminants and which could result in employee exposure in excess of its dose or permissible exposure limit.

**Immediately dangerous to life or health (IDLH)** means any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a permit space.

**Non-permit space** means a confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

**Permit-required confined space (permit space)** means a confined space that has one or more of the following characteristics:

- Contains or has a potential to contain a hazardous atmosphere;
- Contains a material that has the potential for engulfing an entrant;

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- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or
- Contains any other recognized serious safety or health hazard.

**Rescue service** means the personnel designated to rescue employees from permit spaces.

## COMMUNICATIONS

Employees and employee representatives are entitled to receive information and communications on the hazards that might be confronted during confined space operations. These include, but are not limited to:

- Atmospheric and other hazards that may be encountered during entry;
- Observe atmospheric monitoring and other pre-entry testing before entry into a confined space;
- Observe written certification that the space is safe for entry and that the pre-entry measures required have been taken; and
- Consultation with employees and their authorized representatives on the development and implementation of all aspects of the permit space program.

The identification list of confined spaces known to exist in the Department of Public Utilities is attached. Not all confined spaces are required to be marked. There may exist unknown confined spaces within the Department. As these are discovered, the Division and Department Safety Specialist shall be notified.

## RESCUE FROM CONFINED SPACES

### **Non-permit confined spaces**

Self-rescue shall be performed from non-permit confined spaces.

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### **Permit-required confined spaces**

When entry operations are required under **IDLH conditions**

When employees are used as the rescue service

- Employees are to be trained by the Fresno Fire Department or other vendor in confined space rescue operations.
- Refresher training shall be afforded each rescue trained employee on a twelve month basis.
- A minimum of four employees shall be used as a rescue service. The attendant, if trained in confined space rescue procedures, may be one of the employees involved in the rescue, but may not enter the confined space.
- Entry into a confined space for the purposes of rescue shall be accomplished in pairs. Two employees must remain outside the confined space to provide non-entry assistance to rescuers.
- Rescuers shall be equipped according to the anticipated hazards associated with the confined space.

When a rescue service is employed

- The Fresno Fire Department is currently the only known, immediately available rescue service in the City of Fresno. Unless other, more economical rescue services are identified, this organization will be used as the rescue service.
- Training operations shall be made available to the rescue service to assure that the rescuers are familiar with the hazards that may be confronted and needed equipment be identified.
- Where the rescue service can not provide rescue equipment, it is the responsibility of the affected Division to provide this equipment.

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When entry operations are required in **other than IDLH conditions**

- Self-rescue by entrants is the preferred method of rescue.
- Attendants may perform non-entry rescue.
- All entrants shall be connected by means of a rope securely attached to both the entrant and a stationary object outside the confined space to facilitate rescue.
- The attendant must be provided with a means of communication to communicate with both entrants to determine their status and to summon outside rescue services in an emergency. The communications device shall be tested before entry is authorized.
- The Fresno Fire Department or other rescue service shall be notified, before entry, that a confined space operation is going to be conducted.

### DESIGNATED NON-PERMIT CONFINED SPACE OPERATIONS

Attached are operating procedures and specially issued pre-entry checklists for confined spaces that, through experience are designated non-permit spaces unless it is discovered that the space contains hazards that are beyond the limits of the permit or the operation is authorized in excess of the authorized time authorization for the permit.

Prior to entry into any of the designated spaces, the entrant must assure that all the hazards that might be confronted are tested for or effectively eliminated.

### APPENDIXES

- |            |   |
|------------|---|
| Appendix A | List of Confined Spaces   |
| Appendix B | Alternate Entry Procedures for below Grade Valve and Metering Vaults/pits (Physically Separated from a Wet Well And With Closed Piping System) - Alternate Confined Space Entry Procedure |
| Appendix C | Entry Procedures for the Dewatering Building Sludge Silo  |
| Appendix D | Alternate Entry Procedures for below Grade Electrical Vaults/pits - Alternate Confined Space Entry Procedure  |

# LIST OF CONFINED SPACES

NOT ALL CONFINED SPACES ARE MARKED

THERE MAY BE CONFINED SPACES IN THE WORKSITE THAT ARE NOT LISTED

LOCATION	ANTICIPATED HAZARDS
Sewer Lines and Piping - Including manholes - Where found	Biohazards Oxygen deficiency Hydrogen Sulfide Carbon Monoxide LEL greater than 10% Engulfment
Storm Drains - Including manholes - Where found	Biohazards Oxygen deficiency Hydrogen Sulfide Carbon Monoxide LEL greater than 10% Engulfment
Clarifiers	Biohazards Oxygen deficiency Hydrogen Sulfide Carbon Monoxide LEL greater than 10% Engulfment
Aeration Basins	Biohazards Oxygen deficiency Hydrogen Sulfide Carbon Monoxide LEL greater than 10% Engulfment
Digesters	Biohazards Oxygen deficiency Hydrogen Sulfide Carbon Monoxide Ammonia LEL greater than 10% Engulfment

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LOCATION	ANTICIPATED HAZARDS
Dry Wells	Oxygen deficiency Hydrogen Sulfide Carbon Monoxide LEL greater than 10%
Wet Wells	Biohazards Oxygen deficiency Hydrogen Sulfide Carbon Monoxide LEL greater than 10% Engulfment
Sludge Silo (including stairwell)	Engulfment (in tank) Entrapment (in conveyor) Ammonia Biohazards
Chemical Storage and Distribution Tanks	Oxygen deficiency Specific Chemical hazard (Check MSDS for each tank)
Electrical Vaults	Explosion from spark Electrical shock Oxygen deficiency Hydrogen Sulfide Carbon Monoxide LEL greater than 10%
Lift Stations	Biohazards Oxygen deficiency Hydrogen Sulfide Carbon Monoxide LEL greater than 10% Engulfment

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LOCATION	ANTICIPATED HAZARDS
Headworks Compactor	Biohazards Hydrogen Sulfide LEL greater than 10% Engulfment Worm Screw
Headworks Snails and Teacup	Biohazards Oxygen deficiency Hydrogen Sulfide Carbon Monoxide LEL greater than 10% Engulfment
Bar Screens	Biohazards Oxygen deficiency Hydrogen Sulfide Carbon Monoxide LEL greater than 10% Engulfment
Valve Pits	Biohazards Oxygen deficiency Hydrogen Sulfide Carbon Monoxide LEL greater than 10%
Winery Lines and Piping - Including manholes - Where found	Oxygen deficiency Hydrogen Sulfide Carbon Monoxide Aldehydes Alcohol LEL greater than 10% Engulfment
Water Storage Tanks and Vessels	Oxygen deficiency Engulfment



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THERE MAY BE CONFINED SPACES IN THE WORKSITE THAT ARE NOT LISTED

LOCATION	ANTICIPATED HAZARDS
Air Stripping Towers	Oxygen deficiency Engulfment Entrapment Overhead falling hazards VOC's - When performing maintenance
Compaction Equipment	Entrapment
Swimming Pool Filtration and Chlorination Vaults	Oxygen deficiency Carbon Dioxide Chlorine gas Engulfment Entrapment Electrocution
Construction Holes (over 4 feet deep)	Engulfment Entrapment
GAC	Oxygen deficiency Engulfment Entrapment Carbon DBCP

## STANDING OPERATING PROCEDURE

SUBJECT     ALTERNATE ENTRY PROCEDURES FOR BELOW GRADE VALVE AND METERING VAULTS/PITS (PHYSICALLY SEPARATED FROM A WET WELL AND WITH CLOSED PIPING SYSTEM) - ALTERNATE CONFINED SPACE ENTRY PROCEDURE

### PURPOSE

Below grade open top vaults and metering pits at the Wastewater Management Division are considered a confined space. To comply with the alternate entry procedures of Title 8, the following has been established as meeting the minimum requirements.

### HAZARD ASSESSMENT

The major hazard associated with entry into a below grade valve and metering vault is possible buildup of vapors from flammable or combustible liquids and possible ignition of gases.

The second hazard associated with entry is the possibility of a buildup of Hydrogen Sulfide and oxygen deficiency in the vault.

### ENTRY PROCEDURE

To meet the requirements of alternate entry of Title 8, the operator must prove that flammable or toxic atmospheres are not present. This can be accomplished by monitoring the atmosphere (see SOP for Operating Gas Meter - GASTEC Model GT 402) prior and during entry and completing the attached form to document that monitoring was accomplished. All permits shall be valid for no longer than 30 minutes from the time of initial atmospheric testing.

At any time that the permissible exposure limit for oxygen, hydrogen sulfide, carbon dioxide; or that the lower explosive limit exceeds 10% LEL; the entry will be terminated and the requirements outlined in DPU Safety Policy 1, *Confined Space Entry*, will be implemented.

<p style="text-align: center;"><b>ALTERNATE ENTRY PERMIT</b>  <b>BELOW GRADE VALVE AND METERING VAULTS/PITS</b></p>			
Location		Date	
Issued by		Time	
<p style="text-align: center;"><b>ATMOSPHERIC TESTING</b></p>			
LEL	O <sub>2</sub>	H <sub>2</sub> S	CO
<p>This permit is valid only for 30 minutes. If LEL exceeds 10% or if PEL is exceeded on hazardous atmospheres, entry is to be terminated immediately. The purpose for entry is to make valve adjustments, make meter calibrations, and take meter reading only.</p>			

<p style="text-align: center;"><b>ALTERNATE ENTRY PERMIT</b>  <b>BELOW GRADE VALVE AND METERING VAULTS/PITS</b></p>			
Location		Date	
Issued by		Time	
<p style="text-align: center;"><b>ATMOSPHERIC TESTING</b></p>			
LEL	O <sub>2</sub>	H <sub>2</sub> S	CO
<p>This permit is valid only for 30 minutes. If LEL exceeds 10% or if PEL is exceeded on hazardous atmospheres, entry is to be terminated immediately. The purpose for entry is to make valve adjustments, make meter calibrations, and take meter reading only.</p>			

<p style="text-align: center;"><b>ALTERNATE ENTRY PERMIT</b>  <b>BELOW GRADE VALVE AND METERING VAULTS/PITS</b></p>			
Location		Date	
Issued by		Time	
<p style="text-align: center;"><b>ATMOSPHERIC TESTING</b></p>			
LEL	O <sub>2</sub>	H <sub>2</sub> S	CO
<p>This permit is valid only for 30 minutes. If LEL exceeds 10% or if PEL is exceeded on hazardous atmospheres, entry is to be terminated immediately. The purpose for entry is to make valve adjustments, make meter calibrations, and take meter reading only.</p>			

THIS PERMIT IS TO BE RETAINED FOR ONE YEAR IN THE SAFETY OFFICE

## STANDING OPERATING PROCEDURE

SUBJECT     ENTRY PROCEDURES FOR THE DEWATERING BUILDING SLUDGE SILO

### PURPOSE

To establish alternate confined space entry procedures for periodic cleaning and maintenance of equipment and facilities in the Dewatering Building Sludge Silo.

### HAZARD ASSESSMENT

The sludge silo is known to contain atmospheric concentrations of Ammonia. The amount of ammonia present varies according to the time of day, the operation of the belt filter presses, and operation of the conveyor system. Readings indicate that there are times that entry can be made into the silo stairwell and service area without respiratory protection. The permissible exposure limit (PEL) for ammonia is 25 ppm.

### ENTRY PROCEDURE

To meet the requirements of alternate entry of Title 8, the employee must prove that flammable or toxic atmospheres are not present. This can be accomplished by monitoring the atmosphere using the AIM gas detector (model 450) prior and during entry and completing the attached form to document that monitoring was accomplished. All permits shall be valid for no longer than 60 minutes from the time of initial atmospheric testing.

At any time that the permissible exposure limit for ammonia the entry will be terminated and the requirements outlined in DPU Safety Policy 1, *Confined Space Entry*, will be implemented.

Employees are required to have respiratory protection with them during the entry and don that equipment if the PEL is exceeded.

Air monitoring shall be accomplished every 15 minutes.

<p style="text-align: center;"><b>ALTERNATE ENTRY PERMIT</b>  <b>DEWATERING BUILDING, SLUDGE SILO</b></p>			
<p>Location  Dewatering Building, Sludge Silo</p>		<p>Date Issued</p>	
<p>Issued by</p>		<p>Time Issued</p>	
<p style="text-align: center;"><b>EXPOSED EMPLOYEES</b></p>			
<p style="text-align: center;"><b>AMMONIA ATMOSPHERIC TESTING</b>  <b>RECORD READING EVERY 15 MINUTES</b></p>			
TIME	READING	TIME	READING
<p><b>This permit is valid only for 60 minutes.</b> If the permissible exposure limit (<b>25 ppm</b>) for ammonia is exceeded, full confined space operations procedures (DPU Safety Policy Memorandum Number 1) apply. Entry is authorized using this permit for the following purposes only: washdown of the conveyor system, lubrication of equipment, restoring power to the conveyor system, minor maintenance. Employee is required to carry a respirator during the entire operation. If the permissible exposure limit is exceeded, the employee is to don the respirator, evacuate the silo immediately, and terminate operation.</p>			

<p style="text-align: center;"><b>ALTERNATE ENTRY PERMIT</b>  <b>DEWATERING BUILDING, SLUDGE SILO</b></p>			
<p>Location  Dewatering Building, Sludge Silo</p>		<p>Date Issued</p>	
<p>Issued by</p>		<p>Time Issued</p>	
<p style="text-align: center;"><b>EXPOSED EMPLOYEES</b></p>			
<p style="text-align: center;"><b>AMMONIA ATMOSPHERIC TESTING</b>  <b>RECORD READING EVERY 15 MINUTES</b></p>			
TIME	READING	TIME	READING
<p><b>This permit is valid only for 60 minutes.</b> If the permissible exposure limit (<b>25 ppm</b>) for ammonia is exceeded, full confined space operations procedures (DPU Safety Policy Memorandum Number 1) apply. Entry is authorized using this permit for the following purposes only: washdown of the conveyor system, lubrication of equipment, restoring power to the conveyor system, minor maintenance. Employee is required to carry a respirator during the entire operation. If the permissible exposure limit is exceeded, the employee is to don the respirator, evacuate the silo immediately, and terminate operation.</p>			

**THIS PERMIT IS TO BE RETAINED FOR ONE YEAR IN THE SAFETY OFFICE**

## STANDING OPERATING PROCEDURE

SUBJECT     ALTERNATE ENTRY PROCEDURES FOR BELOW GRADE ELECTRICAL  
VAULTS/PITS - ALTERNATE CONFINED SPACE ENTRY PROCEDURE

### PURPOSE

Below grade open top electrical vaults at the Wastewater Management Division are considered a confined space. To comply with the alternate entry procedures of Title 8, the following has been established as meeting the minimum requirements.

### HAZARD ASSESSMENT

The major hazard associated with entry into a below grade electrical vaults is from flammable or combustible liquids and possible ignition of gases.

The second hazard associated with entry is the possibility of a buildup of Hydrogen Sulfide and oxygen deficiency in the vault.

### ENTRY PROCEDURE

To meet the requirements of alternate entry of Title 8, the operator must prove that flammable or toxic atmospheres are not present. This can be accomplished by monitoring the atmosphere (see SOP for Operating Gas Meter - GASTEC Model GT 402) prior and during entry and completing the attached form to document that monitoring was accomplished. All permits shall be valid for no longer than 2 hours from the time of initial atmospheric testing.

At any time that the permissible exposure limit for oxygen, hydrogen sulfide, carbon dioxide; or that the lower explosive limit exceeds 10% LEL; the entry will be terminated and the requirements outlined in DPU Safety Policy 1, *Confined Space Entry*, will be implemented.

ALTERNATE ENTRY PERMIT BELOW GRADE ELECTRICAL VAULTS/PITS			
Location		Date	
Issued by		Time	
ATMOSPHERIC TESTING			
LEL	O <sub>2</sub>	H <sub>2</sub> S	CO
<p>This permit is valid only for 2 hours. The atmosphere will be monitored every 30 minutes and the results recorded above. If LEL exceeds 10% or if PEL is exceeded on hazardous atmospheres, entry is to be terminated immediately. The purpose for entry is to perform wire pulls, perform maintenance and repairs on wires and vault structures. This permit can not be used if performing hotwork.</p>			

ALTERNATE ENTRY PERMIT BELOW GRADE ELECTRICAL VAULTS/PITS			
Location		Date	
Issued by		Time	
ATMOSPHERIC TESTING			
LEL	O <sub>2</sub>	H <sub>2</sub> S	CO
<p>This permit is valid only for 2 hours. The atmosphere will be monitored every 30 minutes and the results recorded above. If LEL exceeds 10% or if PEL is exceeded on hazardous atmospheres, entry is to be terminated immediately. The purpose for entry is to perform wire pulls, perform maintenance and repairs on wires and vault structures. This permit can not be used if performing hotwork.</p>			

THIS PERMIT IS TO BE RETAINED FOR ONE YEAR IN THE SAFETY OFFICE